



Florida Institute of Technology

**AVAILABLE
TECHNOLOGY**

THE INFINITY FAN 3D OSCILLATION VIA A SPHERICAL MECHANISM

Summary

The Infinity Fan (U.S. patent no. 6,213,715) was designed and fabricated by Stacy L. Dees, John S. John and Dr. Pierre M. Larochelle with the support of a Research Experiences for Undergraduates supplement to grant #DMI9612062 from the National Science Foundation. The Infinity Fan is designed to be either a desktop or standing fan with motion in both the vertical and horizontal directions. The motion that the spherical mechanism produces makes the fan face move in an "infinity" or sideways figure-eight pattern upon a spherical surface. The fan head spans 80 degrees in the horizontal plane and 40 degrees in the vertical plane. This path was developed to circulate the air in a room with the fan placed in a corner. The Infinity Fan provides both back-and-forth and up-and-down movement in a continuous sweeping motion-all powered by only one motor.

Applications

- The Infinity Fan is directly applicable to desktop, ceiling, and free-standing fans for consumer and industrial uses.
- Moreover, the technology is applicable to mixing and stirring machines.

Advantages

- The Infinity Fan has the advantage of providing a unique "infinity" pattern of purely spherical movement, i.e. 3-D rotational, while only requiring a single motor.

The Technology

At the heart of the Infinity Fan is a unique spherical four-bar mechanism that generates the infinity motion of the fan head. An idealized rendering of the mechanism is shown below. The fan head traces out the yellow infinity curve on the sphere as the mechanism moves. An object of the present invention is to fulfill the need referred to above. In accordance with the principles of the present invention, this objective is obtained by providing a fan structure including a fan head having a plurality of blades mounted for rotation. A mechanism is coupled to the fan head and is constructed and arranged to move the fan head along a surface of a sphere in a three dimensional pattern. At least one motor is constructed and arranged to cause rotation of the blades and movement of the mechanism. The mechanism thus provides both back-and-forth and up-and-down motion of the fan head.

In accordance with another aspect of the invention, a method provided to move an object in three spatial planes. The method includes defining a reference coordinate system having an origin at a center of a sphere. Four links are then pivotally coupled together at four joints such that axes of the joints intersect at the origin thereby defining a spherical four-bar mechanism. An object is coupled to one of the links. The mechanism is caused to move which causes movement of the object along a surface of the sphere in a three dimensional pattern.

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